Gamasellevans, a new genus of Rhodacaridae (Acari) from South African soils

by

G. C. LOOTS and P. A. J. RYKE

Institute for Zoological Research, Potchefstroom University, Potchefstroom.

INTRODUCTION

The present paper deals with part of a collection of rhodacarid mites recovered from soil by means of Berlese funnels. Of the seven new species for which a new genus is created, two were found in pasture soil near Potchefstroom whereas the other five were collected from the floor of the evergreen indigenous montane forest at Magoebaskloof in the Northern Transvaal. The genus is referred to the Rhodacaridae mainly on account of the presence of a divided dorsal shield in the nymphal stages and the nature of the chaetotaxy of the legs (Evans, 1963) which is basically similar to that of the other known rhodacarid genera. The type material of the new species is deposited in the collection of the Institute for Zoological Research, Potchefstroom University.

GAMASELLEVANS gen. nov.

Diagnosis: Small, well sclerotized mites with an entire dorsal shield in the adult stages but line of demarcation between podonotum and opisthonotum clearly visible. Dorsum of both adult and deutonymph bearing 43 pairs of setae, 22 pairs of which are situated on the podonotal region. The j, z and s series are each composed of the normal complement of six setae whereas the r series is reduced to four, r1 and r6 being absent. The J, Z and S series have the normal five setae each but the R series is composed of six setae. In the deutonymph the dorsum is covered by two shields, the anterior shield being considerably larger than the posterior one; setae r4 and r5 as well as the entire R series are not placed on the dorsal shields. The dorsum of the protonymph is provided with 30 pairs of setae, 15 pairs on each of the podonotum and opisthonotum. The larva has 18 pairs of setae on the dorsum with 9 pairs on each of the two regions.

The sternal shield of the female bears four pairs of simple setae. The genital shield is provided with a membranous epigynial process. The opisthogaster carries seven pairs of setae excluding the circumanal setae; the para-anals are situated approximately in line with the anterior margin of the anus. In the larva the posterolateral margins of the anal aperture bears a pair of minute setae

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

in addition to the normal circumanals; similar conditions obtain in other larvae of the Mesostigmata e.g. in *Rhodacarus roseus* (Hirschmann, 1962).

The fixed digit of the female chelicera bears five teeth and the movable digit is tridentate. In the male the fixed digit has four or five teeth whereas the movable digit, which is much smaller and either unidentate or devoid of teeth, bears a relatively long spermatophoral process which originates from its distal third. Whereas the synarthrodial membrane of the female chelicera is normal for the Rhodacaridae that of the male consists of a broad membranous process which tapers distally to a sharp point; this membrane which bears fine bristles on its outer surface, enfolds the movable digit.

All the legs are provided with claws and pulvilli. Various degrees of reduction occur in the pretarsus of leg I. Leg II is well armed in the male.

Type species: *Gamasellevans epigynialis* spec. nov.

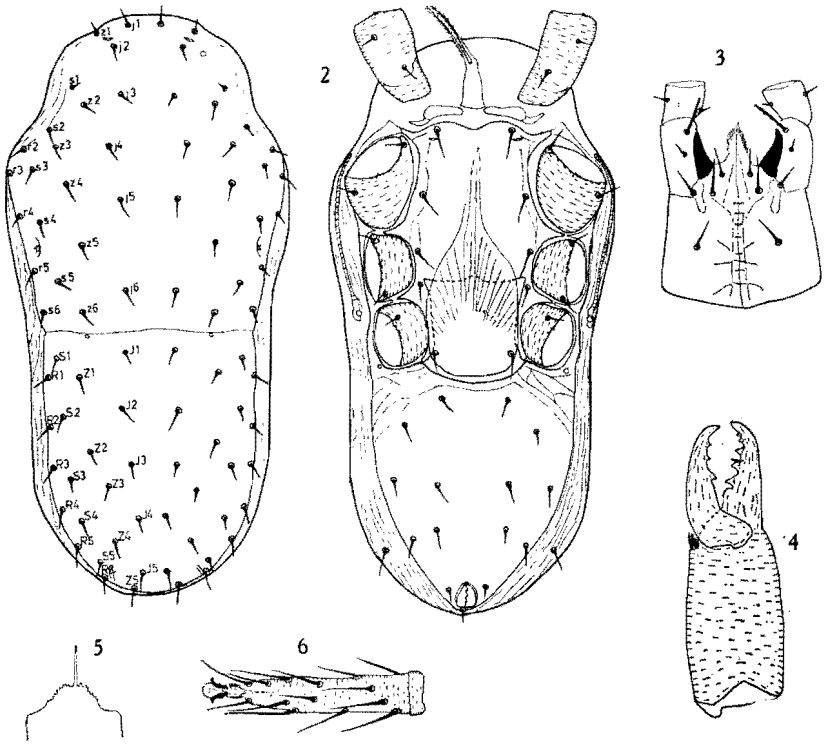
Key to the species of Gamasellevans.

1. Exopodal, metapodal and ventri-anal shields fused 2
— Fused exopodal and metapodal shields free from ventri-anal shield 4
2. Ventri-anal shield with 13 setae; fixed digit of male chelicerae with spermadactyl-like process . . . . . **bispermadactylus**
— Ventri-anal shield with 15 setae; fixed digit of male chelicerae without process . . 3
3. Small, weakly sclerotized specimens measuring 250-260μ in length; line of demarcation between podonotum and opisthonotum distinct . . . . . **epigynialis**
— Relatively large, well sclerotized specimens measuring 376-385μ in length; line of demarcation indistinct; male chelicerae with exceptionally long spermatophoral process . . . . . **spermadactylus**
4. Scapular setae (r3) with bifurcated distal ends 5
— Scapular setae simple 6
5. Ventri-anal shield with 15 setae; shields reticulated . . . . . **reticulatus**
— Ventri-anal shield with 13 setae; dorsal and ventri-anal shields not reticulated **evansi**
6. Metapodal shield complex with one pair of pore-like structures; pretarsus of leg I slightly reduced; fixid digit of ♂ chelicerae with lateral hook-like process distally **vandenbergi**
— Metapodal shield complex with two pairs of pore-like structures; claws of leg I almost sessile; fixed digit of ♂ with small anteriorly directed process . . **magoebaensis**

Gamasellevans epigynialis spec. nov., figs. 1-15

FEMALE (figs. 1-6): Length 250-260 μ; breadth 124-135 μ; leg I (excluding pretarsus) 260-270 μ; leg IV 193-205 μ; length of ventri-anal shield 98-102 μ; breadth 91-102 μ; breadth of genital shield (at level of setae) 35-40 μ; length of sternal shield 65-70 μ; breadth (between coxae II) 47-51 μ; length of podonotal region of dorsal shield 133-138 μ; breadth 124-130 μ; length of opisthonotal region of dorsal shield 112-119 μ; breadth 98-105 μ; postanal seta 5 μ; vertical setae 9 μ; scapular setae (r3) 8 μ; setae j5 7 μ.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).



Figs. 1-6. *Gamasellevans epigynialis* spec. nov., female. 1. dorsum; 2. venter; 3. gnathosoma; 4. chelicera; 5. tectum; 6. tarsus I.

Dorsum (fig. 1): The dorsum is provided with 43 pairs of simple setae which are all placed on the shield. The podonotum bears 22 pairs, the j, z and s series having six setae each and the r series four (r1 and r6 are absent). The opisthonotum carries 21 pairs of setae, the J, Z and S series having five setae each and the R series six. Setae J5 are situated well removed from the posterior margin of the opisthonotum. The line of demarcation between the fused anterior and posterior dorsal shields is distinct. The podonotum and opisthonotum are provided with three pairs and one pair of pores respectively. The dorsal shield which is finely punctated does not cover the entire dorsum.

Venter (fig. 2): All the shields on the venter are relatively weakly sclerotized. The sternal shield which is longer than broad, bears three pairs of simple setae, the fourth pair of sternal setae being placed on the metasternal-endopodal shield. The latter is fused with the sternal shield, (fig. 2) which bears a pair of pores near the anterior margin of the shield. The sternal shield is finely punctated and provided with a few line ornamentations near the lateral margins.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

The pre-endopodal shields are large but weakly sclerotized. The relatively narrow exopodal shields are fused with the ventri-anal shield and bear a pair of pores in line with the posterior margin of coxae IV. Peritremal shields are absent and the peritremes stretch anteriorly to a position well in front of the middle of coxae II. The genital shield has a convex posterior margin and is provided with a pair of simple setae. The epigynial process is very long and the posterior, relatively well sclerotized, part is punctated. The opisthogaster bears seven pairs of simple setae, excluding the circumanals, six pairs of which are situated on the ventri-anal shield. The para-anal setae are placed approximately in line with the anterior margin of the anus, and the postanal seta on the posterior margin of the ventri-anal shield.

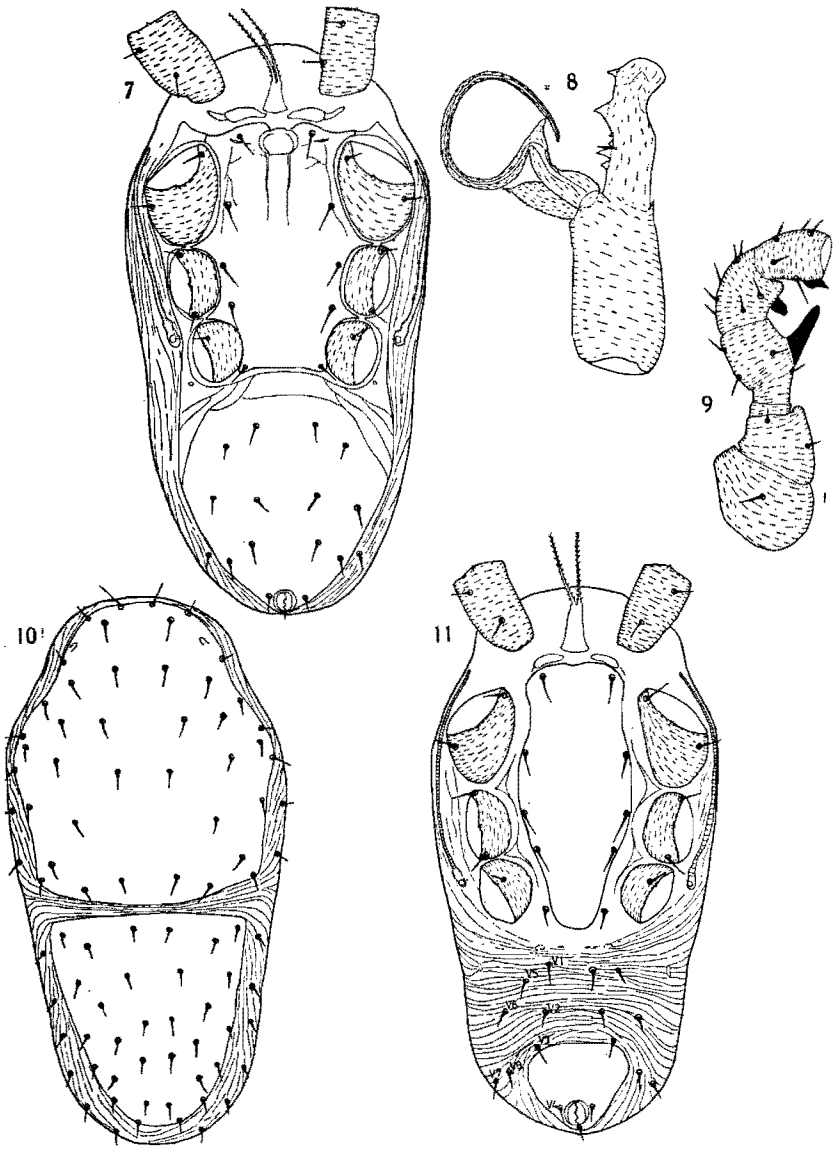
Gnathosoma (figs. 3-5): The corniculi and inner malae stretch anteriorly to a position beyond the anterior margin of the palp trochanter. The relative positions of the four pairs of gnathosomal setae are depicted in fig. 3. The hypostome is provided with eight rows of deutosternal denticles. The palp trochanter bears a stout serrate seta ventrally. The movable digit of the chelicera (fig. 4) is tridentate and the fixed digit bears five teeth. The pilus dentilis is short. The synarthrodial membrane is normal for the Rhodacaridae. The tectum (fig. 5) has a sharply pointed median mucro and a rounded denticulate anterior margin.

Legs (fig. 6): The legs are weakly sclerotized, bear simple setae and are provided with pretarsi, claws and pulvilli. Leg I is longer than the body and its pretarsus (fig. 6) is relatively short. No rod-like or curved setae are present on the tarsus of leg I. The chaetotaxy of the legs, which is normal for the Rhodacaridae, may be summarized (see Evans 1963) as follows:

Leg No.	I	II	III	IV
Trochanter	6	5	5	5
Femur	$(2 - \frac{5}{4} - 2)$	$(2 - \frac{5}{3} - 1)$	6	6
Genu	$(2\frac{3}{2}, \frac{3}{1}2)$	$(2\frac{3}{1}, \frac{2}{1}2)$	$(2\frac{2}{1}, \frac{2}{1}1)$	$(2\frac{2}{1}, \frac{3}{1}1)$
Tibia	$(2\frac{3}{2}, \frac{3}{2}2)$	$(2\frac{2}{1}, \frac{2}{1}2)$	$(2\frac{1}{1}, \frac{2}{1}1)$	$(2\frac{1}{1}, \frac{3}{1}2)$

MALE (figs. 7-9): Length 231-241 μ; breadth 112-123 μ; leg I (excluding pretarsus) 241-250 μ; leg IV 173 μ; length of ventri-anal shield 96-98 μ; breadth 82-89 μ; length of sternitigenital shield 100-105 μ; breadth 44-47 μ; length of podonotal region of dorsal shield 126-131 μ; breadth 118-123 μ; length of

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).



Figs. 7-11. *Gamasellevans epigynialis* spec. nov. 7. venter ♂; 8. chelicera ♂; 9. leg II ♂; 10. dorsum, deutonymph; 11. venter, deutonymph.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

opisthonotal region of dorsal shield 100-107 μ; breadth 89-93 μ; postanal seta 5 μ; vertical setae (jl) 9 μ; scapular setae (r3) 7-8 μ; setae J5 7 μ.

The dorsum of the male is similar to that of the female. The venter (fig. 7) is covered by a sternitigenital and a ventri-anal shield. The finely punctated sternitigenital shield is provided with five pairs of simple setae and one pair of pores. The pre-endopodal shields are similar to those of the female. Peritrematal shields are absent. As in the female the ventri-anal shield is fused with the exopodal shields which bear a pair of pores each. The chaetotaxy of the opisthogaster resembles that of the female (fig. 7). The fixed digit of the chelicera (fig. 8) bears six teeth. It differs from that of the female in that its distal end does not terminate in a sharp tooth but is rounded with a ventrally placed tooth well behind the anterior margin of the fixed digit. The movable digit is curved, tapering to form a sharp tooth distally; in addition to this tooth there is only one small tooth present. The spermatophoral process is relatively long. The synarthrodial membrane at the base of the movable digit is modified as shown in fig. 8.

The legs resemble those of the female except leg II which is armed with spurs (fig. 9).

DEUTONYMPH (figs. 10-11): Length 222 μ; breadth 112-114 μ; leg I 231 μ; leg IV 164 μ; length of anal shield 33-37 μ; breadth 37-42 μ; length of sternal shield 105-107 μ; breadth 37-40 μ; length of anterior dorsal shield 121-124μ; breadth 96-98 μ; length of posterior dorsal shield 82 μ; breadth 65-68 μ; postanal seta 5 μ; vertical setae 9 μ; scapular setae 7 μ; setae J5 7 μ.

Dorsum (fig. 10): The dorsum of the deutonymph shows the typical rhodacarid characteristic in having two subequal dorsal shields; they do not cover the entire dorsum. The podonotum is provided with 22 pairs of simple setae, 20 pairs of which are situated on the anterior dorsal shield.
Setae r4 and r5 are placed on the striated cuticle. The opisthonotum bears 21 pairs of simple setae, 15 pairs of which are situated on the posterior dorsal shield.

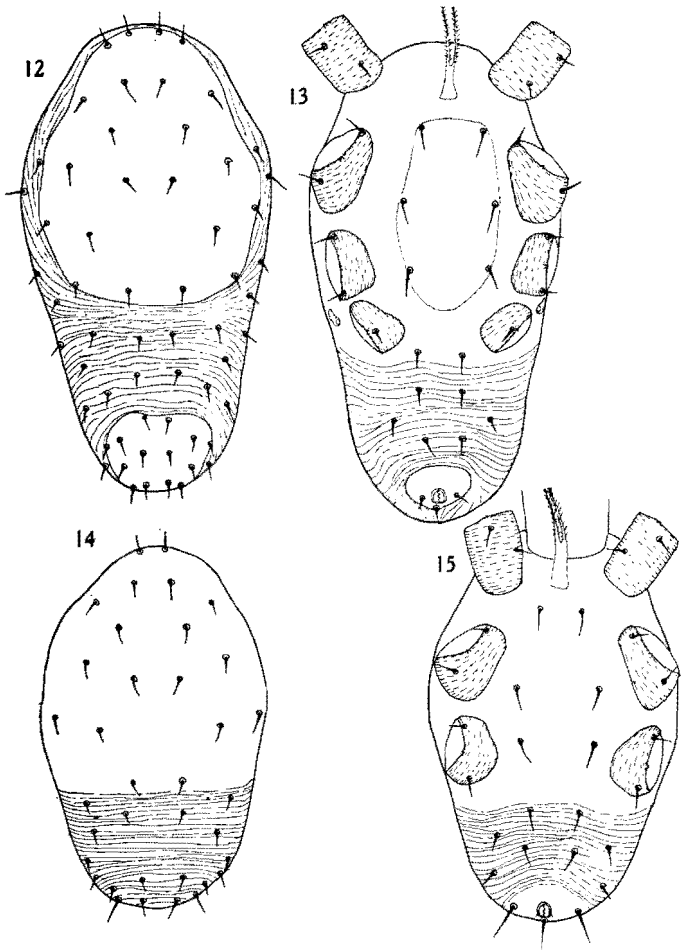
Venter (fig. 11): The sternal shield which is much longer than broad, is provided with four pairs of setae. The genital setae flank the convex posterior margin of the sternal shield. The endopodal shields are free. Exopodal, metapodal and peritremal shields are absent. The pre-endopodal shields are relatively smaller than those of the adult stages. The opisthogastric cuticle is provided with seven pairs of simple setae and the relatively large anal shield bears the normal circumanal setae. Three small plate-like structures are present on the opisthogaster between the anal and sternal shields.

PROTONYMPH (figs. 12-13): Length 186 μ; breadth 109 μ; leg I 207-212 μ; leg IV 152 μ; length of anal shield 16 μ; breadth 33 μ; length of sternal shield 65 μ; breadth 31 μ; length of anterior dorsal shield 104 μ; breadth 95 μ; length of pygidial shield 35-37 μ; breadth 47-49 μ; postanal seta 5 μ; vertical setae 9 μ; scapular setae 7 μ; setae J5 7 μ.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

Dorsum (fig. 12): The podonotum and opisthonotum are each provided with 15 pairs of simple setae. The anterior dorsal shield does not cover the entire podonotum and bears 11 pairs of setae. The j series is composed of five setae, the z series of four and the s and r series of three setae each. One of the setae of the s series and all those of the r series are situated on the cuticle.

The pygidial shield carries only seven pairs of setae. Both the J and Z series are composed of five setae, the first two of which are situated on the cuticle. The S series comprises two setae, the first one being placed on the striated cuticle.



Figs. 12-15. *Gamasellevans epigynialis* spec. nov. 12. dorsum, protonymph; 13. venter, protonymph; 14. dorsum, larva; 15. venter, larva.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

The three setae of the R series are also situated on the cuticle. Both anterior dorsal and pygidial shields are weakly sclerotized.

Venter (fig. 13): The weakly sclerotized sternal shield bears three pairs of simple setae. Pre-endopodal, endopodal, exopodal and peritremal shields are absent. The peritremes are very short and do not reach beyond the posterior margin of coxae III. The genital setae are situated approximately in line with the posterior margin of coxae IV. The opisthogastric cuticle which is heavely striated bears three pairs of simple setae. The anal shield is small and provided with the circumanal setae.

LARVA (figs. 14-15): Length 133-158 μ; breadth 96-103 μ; leg I 191-193 μ; postanal seta 12 μ; para-anal setae 14 μ; vertical setae 12 μ.

The dorsum of the larva (fig. 14) is provided with 18 pairs of simple setae, 9 pairs of which are situated on each of the podonotum and opisthonotum. The larger podonotal region is without striations but the opisthonotum is prominently striated.

The j series is composed of five setae, the z series of three and the r series has only one seta. The s series is absent. The J, S and R series are each composed of three setae, the Z series being absent.

The venter (fig. 15) is devoid of shields. The sternal region bears three pairs of setae whereas the opisthogaster is provided with four pairs, excluding the circumanals. The circumanal setae are relatively longer than the other setae on the venter, the para-anal setae being widely removed from the anus. The lateral margins of the anus, however, are furnished with a pair of minute setae. The cuticle in the vicinity of the anus as well as on the entire notogaster are without striations.

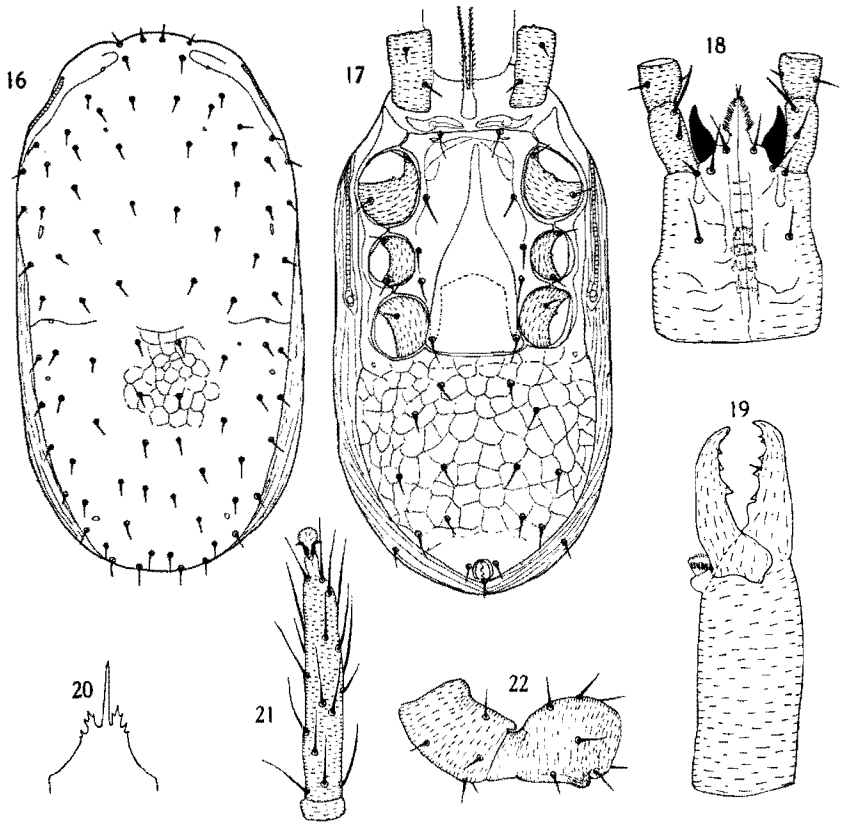
MATERIAL STUDIED: ♀-Holotype, ♂-allotype, morphotype deutonymph, protonymph and larva, and 9 ♀-, 4 ♂-, 3 deutonymph, 3 protonymph and 1 larval paratypes from pasture soil, Agricultural Research Institute, Potchefstroom; collected by G. C. Loots during the period September 1962-September 1963.

Gamasellevans spermadactylus spec. nov., figs. 16-28

FEMALE (figs. 16-21): Length 376-385 μ; breadth 193 μ; leg I 395-405 μ; leg IV 337-347 μ; length of ventri-anal shield 161-163 μ; breadth 165-175 μ; distance between posterior margins of genital and sternal shields 56-58 μ; breadth of genital shield 68-70 μ; length of sternal shield 100-103 μ; breadth 70-72 μ; postanal seta 9 μ; vertical setae 16 μ; scapular setae 12-14 μ; setae J5 12 μ; setae Z5 14 μ.

Dorsum (fig. 16): The entire dorsal shield is provided with 43 pairs of simple setae, 22 pairs of which are situated on the podonotal region. The j, z and s series are each provided with the full complement of six setae and the

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).



Figs. 16-22. *Gamasellevans spermadactylus* spec. nov., female. 16. dorsum; 17. venter; 18 gnathosoma; 19. chelicera; 20. tectum; 21. tarsus I; 22. femur II.

r series with only four setae; setae r1 and r6 are absent. As in *epigynialis* the opisthonotal region of the dorsum bears 21 pairs of setae, their distribution resembling that of the type species.

The line of demarcation between the podonotal and opisthonotal shields is not so clearly distinguishable as in *epigynialis* and it is more or less restricted to the lateral portions of the dorsal shield. The shield bears seven pairs of pores (fig. 16) and the opisthonotal region is ornamented by interconnecting punctated lines. The podonotal region which is finely punctated is devoid of these lines. The dorsal shield does not cover the entire dorsum in the posterior two-thirds of the body.

Venter (fig. 17): To a certain extent the venter resembles that of *G. epigynialis*. The sternal shield is provided with four pairs of simple setae and one pair of pores, situated near the anterior margin. A pair of lateral projections of

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

the sternal shield stretches posteriorly to a position in line with the genital setae. Only a few line ornamentations are present on the anterolateral margins of the sternal shield. The pre-endopodal shields are weakly sclerotized. The exopodal shields are fused with the ventri-anal shield. Relatively narrow peritremal shields are present and the peritremes reach anteriorly to a position approximately in line with the front margin of the exopodal shields. The genital shield consists of a relatively well sclerotized posterior part and a weakly sclerotized anterior portion which tapers to a point. The ventri-anal shield bears six of the seven pairs of opisthogastric setae (excluding the circumanals) and is provided with line ornamentations as is shown in fig. 17. The para-anal setae are situated approximately in line with the anterior margin of the anus. The lateral cuticle is conspicuously striated.

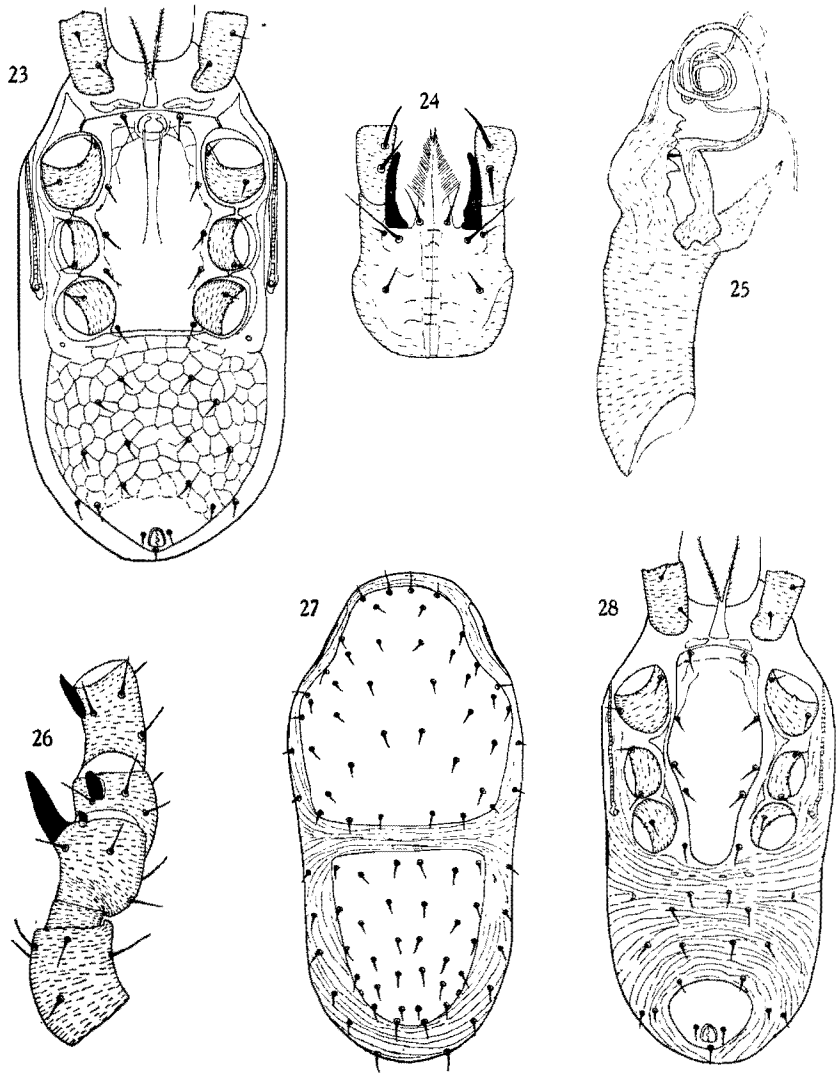
Gnathosoma (figs. 18-20): The corniculi stretch anteriorly to a position in line with the anterior margin of the palp trochanter; the inner malae with their serrated anterior margins are longer than the corniculi (fig. 18). The external posterior rostral setae (gs. 2) are much shorter than the other gnathosomal setae. The capitular groove is provided with eight transverse rows of deutosternal denticles. The anteroventral aspect of the trochanter of the pedipalp bears a stout serrated seta. The fixed digit of the chelicera (fig. 19) bears five small teeth and a relatively small pilus dentilis; the movable digit is tridentate. The synarthrodial membrane is normal for the family. The denticulate anterior margin of the tectum (fig. 20) has a sharply pointed median mucro.

Legs (fig. 21-22): Leg I is slightly longer than the body. Tarsus I (fig.21) is without any modified setae. Trochanter II has a small anterodorsal projection and femur II (fig. 22) bears a ventral spur-like projection. The leg chaetotactic pattern of this species is similar to that of *G. epigynialis.*

MALE (figs. 23-26): Length 366 μ; breadth 183 μ; leg I 395-405 μ; leg IV 337 μ; length of ventri-anal shield 154-156 μ; breadth 158-163 μ; length of sternitigenital shield 161 μ; breadth 70-72 μ; postanal seta 9 μ; vertical setae 16 μ; scapular setae 12 μ; setae J5 12 μ; setae Z5 14μ.

The dorsum of the male is similar to that of the female. The sternitigenital shield is provided with five pairs of simple setae and two pairs of pores (fig. 23). As in the female the exopodal shields are fused with the ventri-anal shield, the complex bearing a pair of pores approximately in line with the posterior margin of coxae IV. The male also resembles the female in the length and position of the peritremes, the peritremal and pre-endopodal shields, the ornamentation of the ventri-anal shield, and the chaetotaxy of the opisthogaster. The corniculi of the male (fig. 24) are longer and more slender than those of the female. The fixed digit of the chelicera (fig. 25) is provided with four small teeth. The movable digit is without teeth but its distal end terminates in a well developed tooth. The long spermatophoral process is distally fused to the movable digit. The synarthrodial membrane at the base of the movable digit resembles that of *G. epigynialis.* Leg II is well armed with spurs (fig. 26).

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).



Figs. 23-28. *Gamasellevans spermadactylus* spec. nov. 23. venter ♂; 24. gnathosoma ♂; 25. chelicera ♂; 26. leg II ♂; 27. dorsum, deutonymph; 28. venter, deutonymph.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

DEUTONYMPH (figs. 27-28): Length 327-337 μ; breadth 164 μ; leg I 347-365 μ; leg IV 289-299 μ; length of anal shield 49-51 μ; breadth 58 μ; length of sternal shield 158-161 μ; breadth 56 μ; length of anterior dorsal shield 177-180 μ; breadth 151-154 μ; length of posterior dorsal shield 121-130 μ; breadth 105-116 μ; the lengths of the setae are the same as those of the male and female.

Dorsum (fig. 27): The dorsum is provided with 43 pairs of simple setae, 22 pairs of which are situated on the podonotum and 21 pairs on the opisthonotum. The anterior dorsal shield is larger than the posterior dorsal shield and bears 20 pairs of setae. The j, z and s series have six setae each and the r series four setae. Setae r1 and r6 are absent and setae r4 and r5 are situated on the striated cuticle.

The smaller posterior dorsal shield is provided with 15 pairs of simple setae. The J, Z and S series have five setae each and are all situated on the posterior shield, the six setae of the R series are placed on the striated cuticle.

Venter (fig. 28): The sternal shield bears four pairs of simple setae and one pair of pores. A pair of weakly sclerotized pre-endopodal shields are present but exopodal and peritremal shields are absent. Two pairs of small platelets are present on the opisthogaster behind the posterior margin of the sternal shield; the metapodal shields are small and inconspicuous. The opisthogastric cuticle is provided with seven pairs of simple setae. The anal shield is normal.

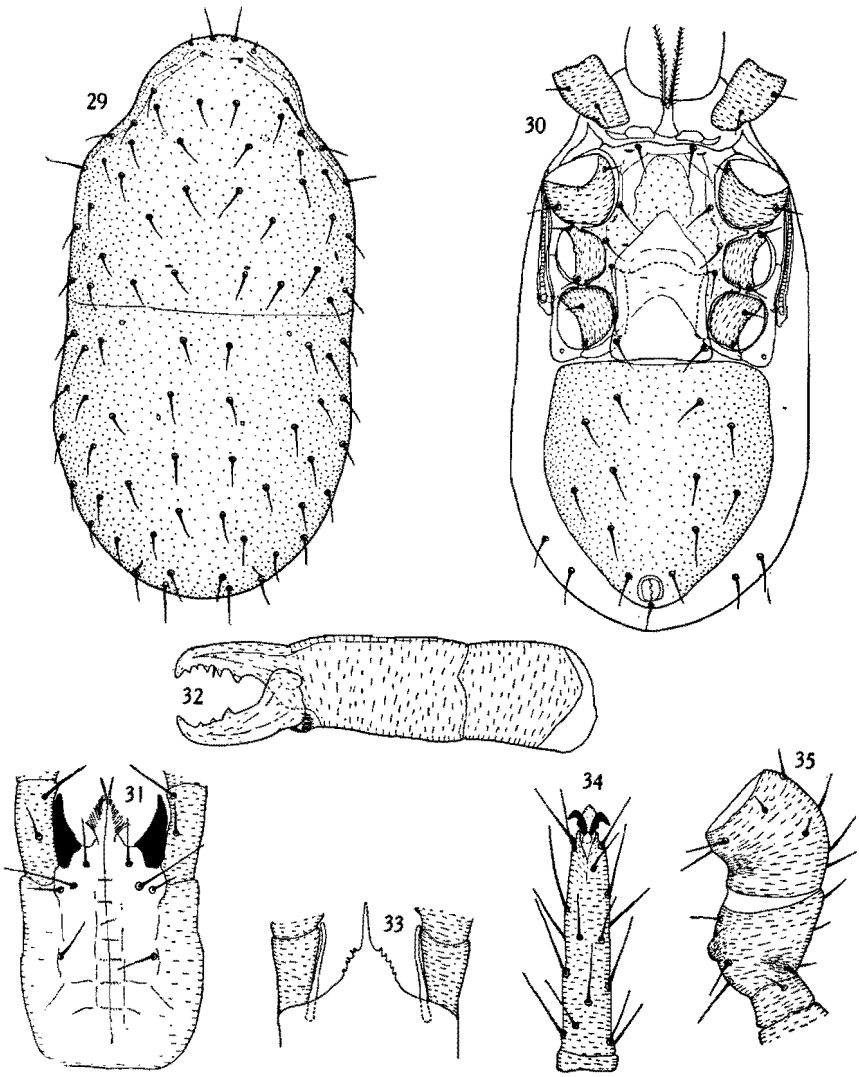
MATERIAL STUDIED: ♀-Holotype, ♂-allotype, morphotype deutonymph, 2 ♀-, 1 ♂- and 2 deutonymph paratypes collected from pasture soil, Agricultural Research Institute, Potchefstroom, by G. C. Loots during the period September 1962-September 1963.

Gamasellevans evansi spec. nov., figs. 29-44

FEMALE (figs 29-35).: Length 452-482 μ; breadth 212-231 μ; leg I 404-433 μ; leg IV 327-356 μ; length of ventri-anal shield 202-211 μ; breadth 183-197 μ; distance between posterior margins of genital and sternal shields 84-93 μ; breadth of genital shield 79-89 μ; length of sternal shield 96-100 μ; breadth 82-84 μ; length of podonotal region of dorsal shield 222-231 μ; breadth 222-231 μ; length of opisthonotal region of dorsal shield 231-250 μ; breadth 241-250 μ; postanal seta 16 μ; vertical setae 23-26 μ; scapular setae 35-40 μ; setae J5 26 μ; setae Z5 30 μ.

Dorsum (fig. 29): As in *epigynialis* and *spermadactylus* 22 pairs of setae are situated on the podonotum and 21 pairs on the opisthonotum. The majority of the dorsal setae are simple but setae r3 have forked distal ends. The distribution of the dorsal setae is basically similar to that of *epigynialis*. Setae r3 and z5 are longer than the majority of the other dorsal setae. The dorsal shield covers the entire dorsum and bears four pairs of pores. The line of demarcation between

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).



Figs. 29-35. *Gamasellevans evansi* spec. nov., female. 29. dorsum; 30. venter; 31. gnathosoma; 32. chelicera; 33. tectum; 34. tarsus I; 35. femur II.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

the podonotal and opisthonotal is less prominent than in *epigynialis*. The punctated dorsal shield is devoid of line ornamentations.

Venter (fig. 30): The sternal shield is ornamented as is shown in the figure. The pre-endopodal shields resemble those of the two species described above in that each consists of a medial and a lateral portion (figs. 2, 17 and 30). The metapodal-exopodal shield complex is not fused with the ventri-anal shield. The peritrematal shields are closely associated with, but not fused to the exopodal shields. The peritremes stretch anteriorly to a position approximately in line with the anterior margin of coxae II. The membranous part of the genital shield has an anterior projection but is not as conspicuous as in *epigynialis* and *spermadactylus*. The opisthogaster is provided with seven pairs of setae in addition to the circumanal setae. Five pairs of these setae are situated on the punctated ventri-anal shield.

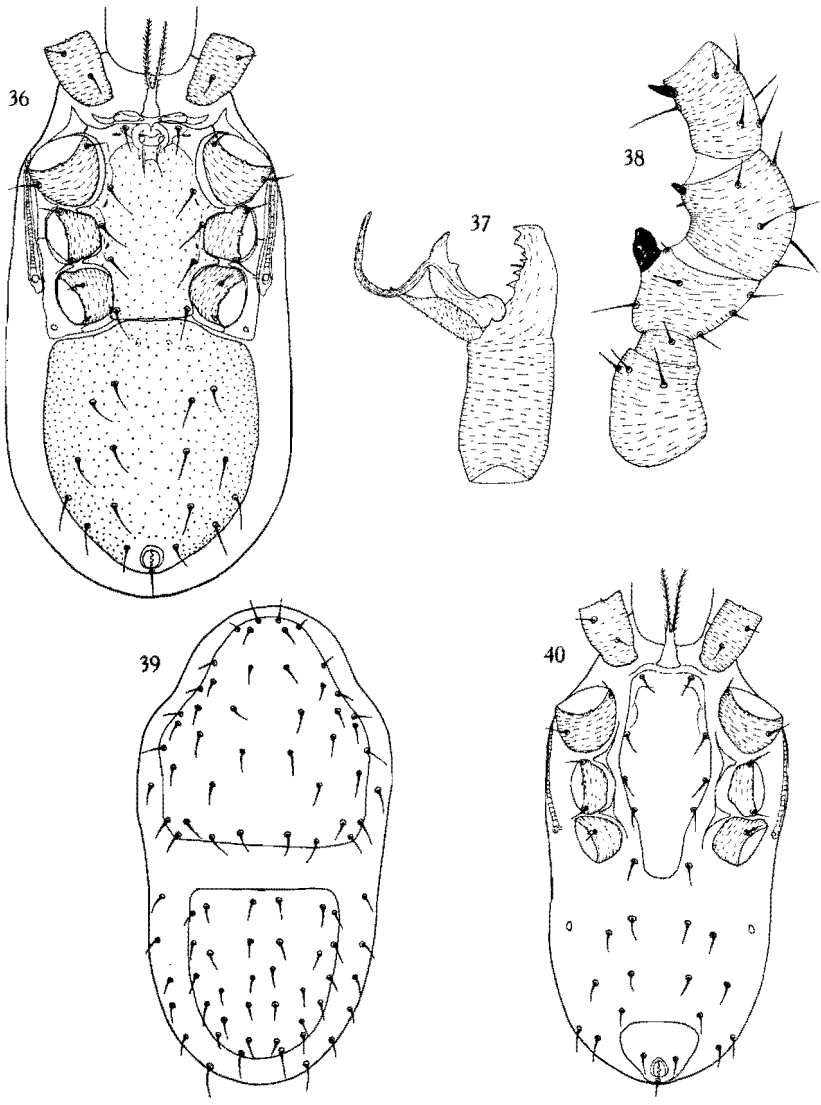
Gnathosoma (figs. 31-33): The inner malae is longer than the corniculi (fig. 31). The internal posterior rostral setae (gs. 3) are about twice as long as the external posterior rostral setae (gs. 2). The capitular groove has seven transverse rows of deutosternal denticles. As in *epigynialis* the palp trochanter is provided with a relatively stout serrated seta ventrally. The fixed digit of the chelicerea (fig. 32) bears five teeth and a small pilus dentilis, the movable digit being tridentate. The tectum (fig. 33) has a denticulate anterior margin and a median mucro. The salivary styli are well developed (fig. 33), reaching anteriorly to a position in front of the anterior margin of the palp trochanter.

Legs (figs. 34-35): A striking difference between this species and *epigynialis* and *spermadactylus* is the absence of a pretarsus on leg I (fig. 34). All the legs are provided with claws and pulvilli. Femur II is provided with a ventrally placed protuberance; coxae IV bears small posteriorly directed spur-like structures. The chaetotactic patterns of the legs are similar to those of the species described above.

MALE (figs. 36-38): Length 452-462 μ; breadth 222-231 μ; leg I 337-347 μ; length of ventri-anal shield 212-222 μ; breadth 182-186 μ; length of sternitigenital shield 163-168 μ; breadth 75-79 μ; length of podonotal region of dorsal shield 222-226 μ; breadth 222-231 μ; length of opisthonotal region 231-241 μ; breadth 231 μ; postanal seta 16 μ; vertical setae 26 μ; scapular setae 35-37 μ; setae J5 26 μ; setae Z5 26 μ.

The dorsum of the male is similar to that of the female. The venter is depicted in fig. 36. The punctated sternitigenital shield is provided with five pairs of simple setae and three pairs of pores. The pre-endopodal, exopodal-metapodal and peritrematal shields resemble those of the female. The punctated ventri-anal shield bears seven pairs of simple setae in addition to the circumanals. The striated lateral cuticle is devoid of setae. The fixed digit of the chelicerae (fig. 37) bears five teeth and its distal end terminates in a tooth-like structure. The movable digit is unidentate. The spermatophoral process is relatively short. The synarthrodial membrane resembles that of *G. epigynialis*. Leg II (fig. 38) is well armed.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).



Figs. 36-40. *Gamasellevans evansi* spec. nov. 36. venter ♂; 37. chelicera ♂; 38. leg II ♂; 39. dorsum, deutonymph; 40. venter, deutonymph.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

DEUTONYMPH (figs. 39-40): Length 294 μ; breadth 154 μ; leg I 250 μ; leg IV 212 μ; length of anal shield 37 μ; breadth 49 μ; length of sternal shield 125 μ; breadth 47 μ; length of anterior dorsal shield 142 μ; breadth 126 μ; length of posterior dorsal shield 96 μ; breadth 89 μ; postanal seta 14 μ; vertical setae 16 μ; scapular setae 19 μ; scapular setae 19 μ; setae J5 12 μ; setae Z5 21 μ.

The dorsum (fig. 39) is covered by two shields with the anterior dorsal shield considerably larger than the posterior one. The podonotal region bears 22 pairs of simple setae, 21 pairs of which are situated on the shield. Only setae r4 are placed on the lateral cuticle whereas in *G. epigynialis* and *G. spermadactylus* r4 and r5 are off the shield.

The venter of the deutonymph (fig. 40) resembles those of the other species described above except that the pre-endopodal shields are not distinct, the anal shield relatively smaller, and the circumanal setae relatively longer; setae V8 are situated behind setae V7 whereas in the other two species they are placed anterior to or in line with setae V7 (setal numbers after Hirschmann, 1962).

PROTONYMPH (figs. 41-42): Length 241-270 μ; breadth 124-149 μ; leg I 202-231 μ; leg IV 164-183 μ; length of anal shield 21-26 μ; breadth 40-42 μ; length of anterior dorsal shield 116-132 μ; breadth 118-142 μ; length of pygidial shield 42-56 μ; breadth 68-72 μ; postanal seta 14-19 μ; vertical setae 16 μ; scapular 19 μ; setae Z5 21 μ.

The dorsum (fig. 41) has 30 pairs of setae, the podonotum and opisthonotum each bearing 15 pairs. The anterior dorsal shield bears 14 pairs of setae and the opisthonotum eight pairs. The J, j, Z and z series each have five setae, the s and R series three and the r and S series two. Setae r3 and Z5 are considerably longer than the other dorsal setae.

The sternal shield is not discernable; three pairs of sternal setae (fig. 42) are present. No endopodal, exopodal or peritrematal shields can be distinguished and the peritremes are very short. The opisthogastric cuticle bears five pairs of setae. The circumanal setae are situated on the triangular anal shield.

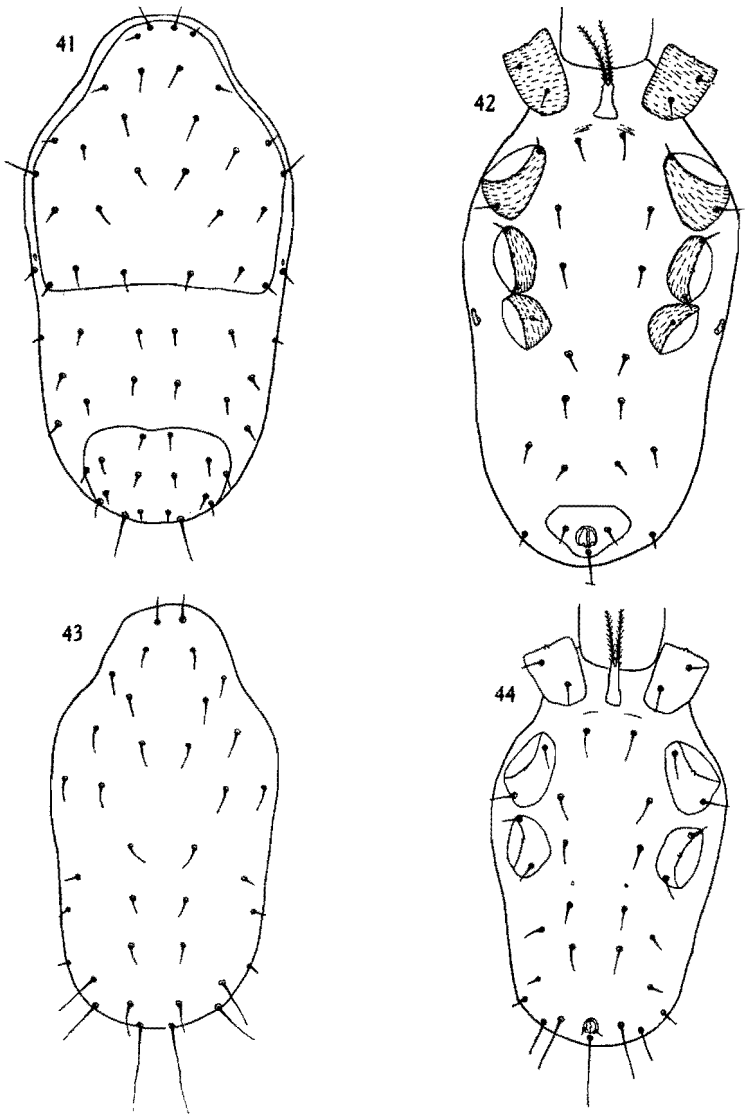
LARVA (figs. 43-44): Length 186-250 μ; breadth 100-144 μ; leg I 161-222 μ; postanal seta 28-47 μ; setae J4 35-58 μ.

The dorsum (fig. 43) is provided with 18 pairs of simple setae of unequal length. Setae J3, J4, S2 and S3 are considerably longer than the rest of the dorsal setae, J4 being the longest. The podonotal and opisthonotal regions are each provided with nine pairs of setae but no shields are discernible. The division between the two dorsal regions is represented by a slight fold of the integument.

No shields can be distinguished on the venter (fig. 44). The sternal region bears three pairs of simple setae and a pair of small pores between sternal setae III and the genital setae. The opisthogaster bears 13 setae. The lateral margins of the anus carry a pair of small setae.

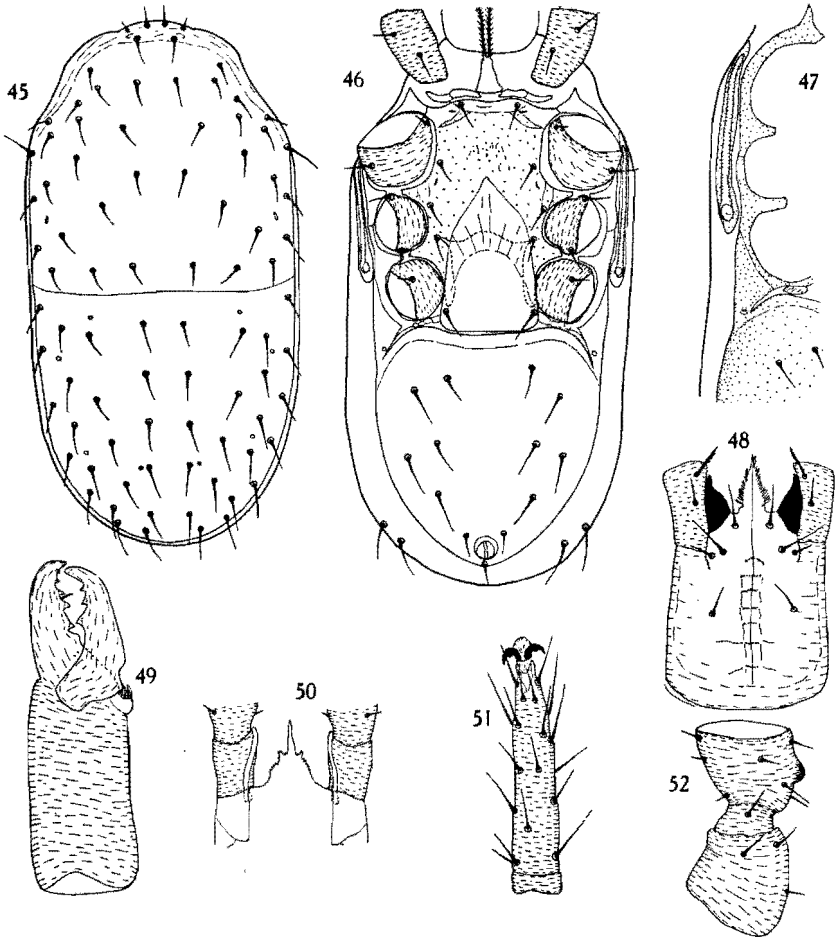
MATERIAL STUDIED: ♀-Holotype, ♂-allotype, morphotype deutonymph, protonymph and larva, 9 ♀-, 9 ♂-, 2 protonymph and 8 larval paratypes from the forest floor, Magoebaskloof, Transvaal; collected by R. A. van den Berg, 1963.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).



Figs. 41-44. *Gamasellevans evansi* spec. nov. 41. dorsum, protonymph; 42. venter, protonymph; 43. dorsum, larva; 44. venter, larva.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).



Figs. 45-52. *Gamasellevans bispermadactylus* spec. nov., female. 45. dorsum; 46. venter; 47. peritreme; 48. gnathosoma; 49. chelicera; 50. tectum; 51. tarsus I; 52. femur II.

Gamasellevans bispermadactylus spec. nov., figs. 45-57

FEMALE (figs. 45-52): Length 327-347 μ; breadth 164-173 μ; leg I 317-327 μ; leg IV 250-270 μ; length of ventri-anal shield 135-142 μ; breadth 133-140μ; distance between posterior margins of sternal and genital shields 63-65 μ; breadth of genital shield 61-65 μ; length of sternal shield 79-82 μ; breadth 61-65 μ; length of the podonotal region of dorsal shield 154-184 μ; breadth 164-173 μ; length of opisthonotal region 154-173 μ; breadth 164-173 μ; postanal setae 9 μ; vertical setae 12-14 μ; scapular setae 21-23 μ; setae Z5 21-23 μ.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

Dorsum (fig. 45): The 43 pairs of setae are distributed as in the other species of the genus described above. Seta R1 probably is r6 which migrated to the opisthonotum, a generic character which also finds expression in the deutonymph (fig.56). The transverse line on the dorsal shield should be regarded as the line of demarcation between the anterior and posterior shields. The majority of the setae on the opisthonotum are slightly longer than those of the podonotum. The dorsum is also provided with five pairs of pores.

Venter (figs. 46-47): The sternal and genital shields are basically similar to those of the other species (fig. 46). The pre-endopodal shields are typical for the genus and are closely associated with the base of the tritosternum. The peritrematal shields are narrow and they are fused to the dorsal shield anteriorly; the peritremes reach anteriod to a position in line with the middle of coxae II. The large metapodal shields are fused with both the exopodal and ventri-anal shields (fig. 47). The opisthogaster bears 17 setae, 13 of which are placed on the ventri-anal shield.

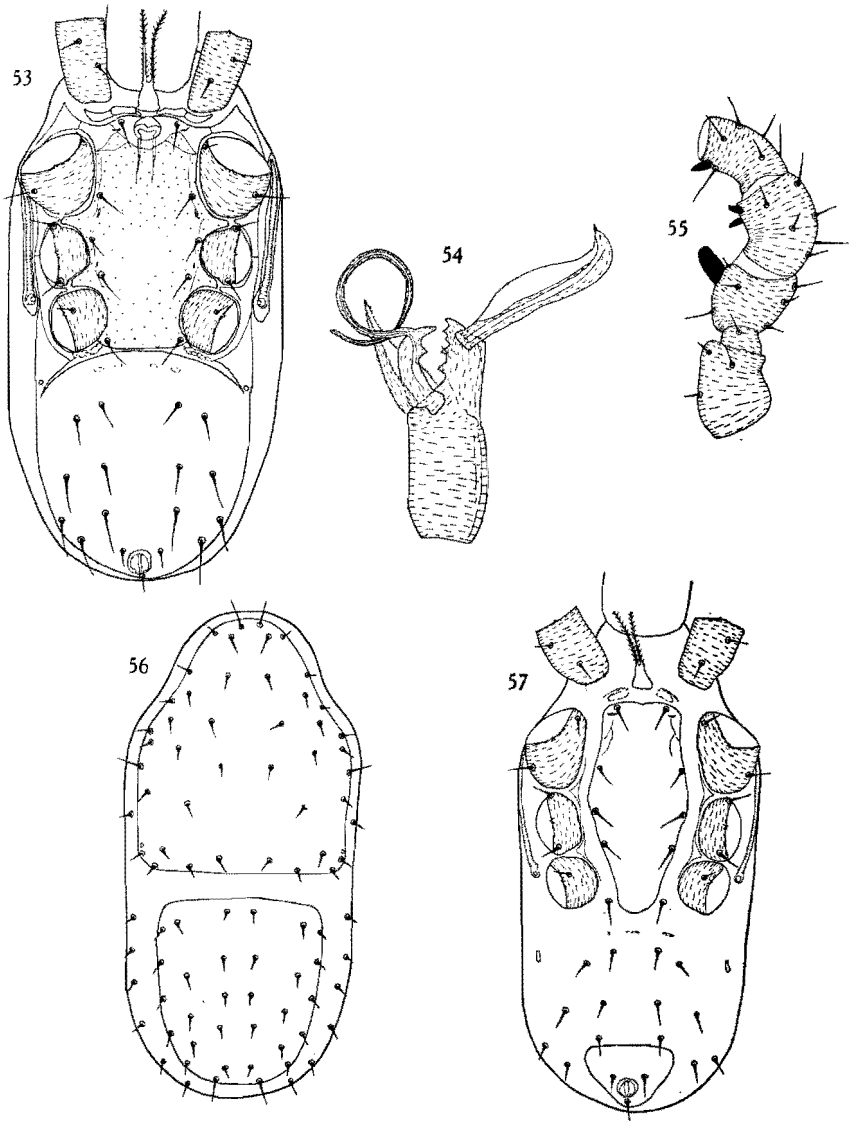
Gnathosoma (figs. 48-50): The corniculi are relatively short and stout. The capitular groove has seven rows of denticles (fig. 48). The palp trochanter bears a serrate seta. The movable digit of the chelicerae is tridentate and the fixed digit has five teeth in addition to the small pilus dentilis. The shape of the tectum is shown in fig. 50.

Legs (figs. 51-52): All the legs are relatively well sclerotized and provided with pretarsi, claws and pulvilli; pretarsus I, however, is much reduced (fig. 51). Femur II bears a protuberance on its ventral aspect (fig. 52). The chaetotactic pattern of the legs is similar to those of the other species.

MALE (figs. 53-55): Length 299-308 μ; breadth 144-154 μ; leg I 270-289 μ; leg IV 212-231 μ; length of ventri-anal shield 126-135 μ; breadth 116-124 μ; length of sternitigenital shield 123-130 μ; breadth 54-56 μ; length of podonotal region of dorsal shield 158-164 μ; breadth 144-154 μ; length of opisthonotal region 136-145 μ; breadth 140-144 μ; postanal seta 7 μ; vertical setae 12-14 μ; scapular setae 16 μ; setae Z5 19 μ.

The dorsum is similar to that of the female. All the opisthogastric setae are situated on the ventri-anal shield (fig. 53). The gnathosoma closely resembles that of *G. spermadactylus*. The chelicerae (fig. 54) are typical for the genus. The spermatophoral process is of moderate length, and the synarthrodial membrane, enveloping the movable digit, is densely covered with minute spines. The fixed digit has four teeth and its distal end bears a peculiar "pseudospermatophoral process"; in this respect it differs from all the other known males of the genus *Gamasellevans*. This process is tube-like with an apparently open anterior end and a curved distal tip terminating in a sharp point. With the exception of leg II (fig. 55) which is armed with spurs the legs are similar to those of the female.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).



Figs. 53-57. *Gamasellevans bispermadactylus* spec. nov. 53. venter ♂; 54. chelicera ♂; 55. leg II ♂; 56. dorsum, deutonymph; 57. venter, deutonymph.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

DEUTONYMPH (figs. 56-57): Length 231 μ; breadth 110 μ; leg I 231 μ; leg IV 173 μ; length of anal shield 28 μ; breadth 42 μ; length of sternal shield 105 μ; breadth 40 μ; length of anterior dorsal shield 118 μ; breadth 102 μ, length of posterior dorsal shield 93 μ; breadth 77 μ; postanal seta 7 μ; vertical setae 12 μ; scapular setae 12 μ; setae Z5 14 μ.

The dorsum is covered by an anterior dorsal shield bearing 21 pairs of setae and a posterior shield bearing 15 pairs. Setae r4 and the entire R series are situated on the lateral cuticle. The venter is basically similar to those of the deutonymphs of the other species. The pre-endopodal shields are weakly sclerotized. The metapodal shields are small but distinct.

MATERIAL STUDIED: ♀-Holotype, ♂-allotype, morphotype deutonymph, 16 ♀- and 4 ♂-paratypes from forest floor, Magoebaskloof, Transvaal; collected by R. A. van den Berg, 1963.

Gamasellevans vandenbergi spec. nov., figs. 58-68

FEMALE (figs. 58-64): Length 337-347 μ; breadth 158-167 μ; leg I 308-317 μ; leg IV 250-260 μ; length of ventri-anal shield 133-137 μ; breadth 126-128 μ; distance between posterior margins of sternal and genital shields 68-72 μ; breadth of genital shield 41 μ; length of sternal shield 72-77 μ; breadth 63-65 μ; length of podonotal region of dorsal shield 173-182 μ; breadth 158-167 μ; length of opisthonotal region 165-174 μ; breadth 149-154 μ; postanal seta 12 μ; vertical setae 26-28 μ; scapular setae 17 μ; setae J5 21-23 μ.

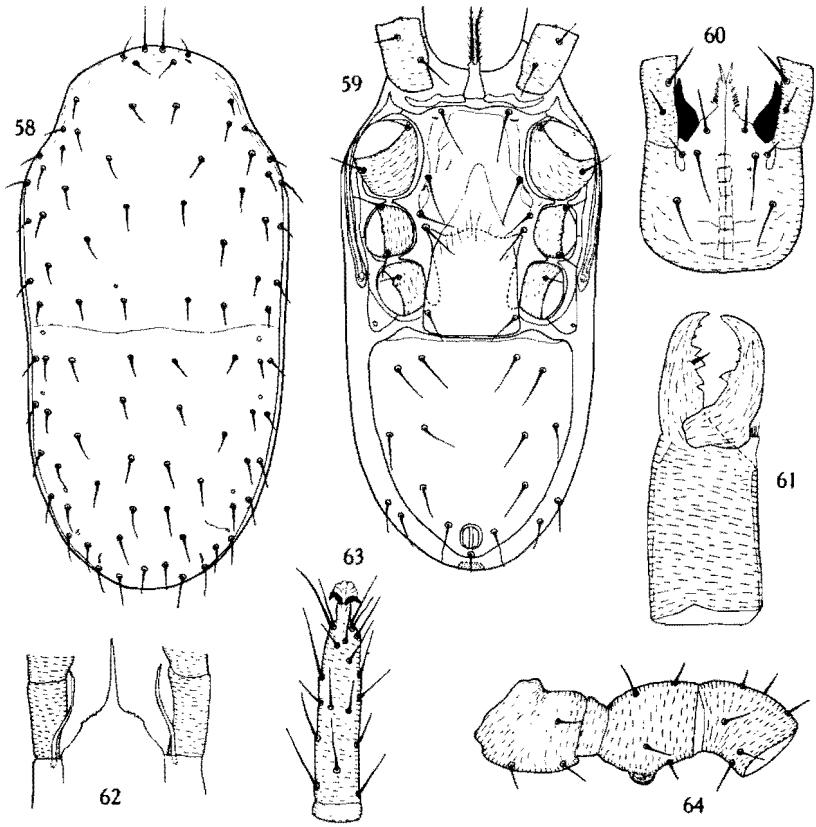
Dorsum: (fig. 58): The 43 pairs of setae and six pairs of pores are distributed as shown in the figure. The numbers of setae in the different series are similar to those of the species described above. This species is characterized by a pair of long vertical (jl) setae). The line of demarcation between the podonotum and opisthonotum is visible on the entire dorsal shield.

Venter (fig. 59): The venter is basically similar to those of the other species of the genus. The triangular metapodal shields are fused with the exopodal shields but relatively well removed from the ventri-anal shield. The postanal seta is shorter than the other setae on the latter shield.

Gnathosoma (figs. 60-62): Setae gs2 are considerably shorter than the other gnathosomal setae (fig. 60). The movable digit of the chelicera (fig. 61) bears one large and two minute teeth; fixed digit has five teeth, two of which are minute, and a pilus dentilis of moderate length. The tectum has a prominent median mucro (fig. 62). The setae on the palp trochanter are simple.

Legs (figs. 63-64): Tarsus I and its reduced pretarsus is shown in fig. 63. Femur II bears a prominent protuberance. The chaetotactic patterns of the legs are the same as those of the other species of the genus.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

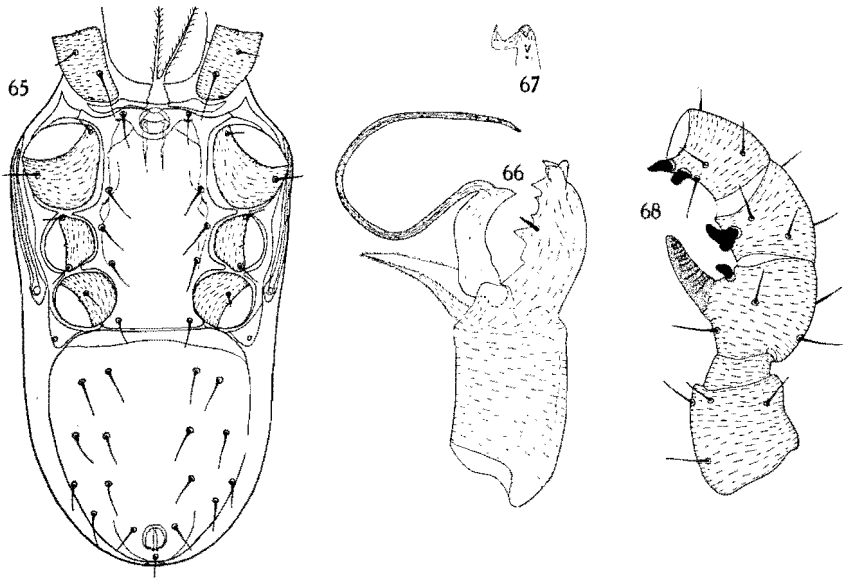


Figs. 58-64. *Gamasellevans vandenbergi* spec. nov., female. 58. dorsum; 59. venter; 60. gnathosoma; 61. chelicera; 62. tectum; 63. tarsus I; 64. femur II.

MALE (figs. 65-68): Length 327 μ; breadth 165-167 μ; leg I 289-299μ; leg IV 241-250 μ; length of ventri-anal shield 140-144 μ; breadth 121-123 μ; length of sternitigenital shield 128-133 μ; breadth 58-63 μ; length of podonotum 173 μ; breadth 165-167 μ; length of opisthonotal region 154 μ; breadth 147-154 μ; postanal setae 9 μ; vertical setae 26 μ; scapular setae 17 μ; setae J5 21 μ.

The dorsum resembles that of the female and the venter (fig. 65) is basically similar to those of the males described above. The metapodal shields are free posteriorly but almost abut the ventri-anal shield. The anus and paraanal setae are flanked by a curved ridge. The chelicerae (fig. 66) are typical of the genus. The spermatophoral process is of moderate length in comparison with those of other species. The fixed digit bears a hook-like lateral projection distally (fig. 67). The synarthrodial membrane resembles that of *G. spermadactylus*. Leg II is heavily armed (fig. 68); in dorsal view the large spur on femur II seems to be composed of concentric rings.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).



Figs. 65-68. *Gamasellevans vandenbergi* spec. nov., male. 65. venter; 66. chelicera; 67. ventral view of distal end of fixed digit of chelicera; 68. leg II.

MATERIAL STUDIED: ♀-Holotype, ♀-allotype, 2 ♀- and 3 ♂-paratypes from forest floor, Magoebaskloof, Transvaal; collected by R. A. van den Berg, 1963.

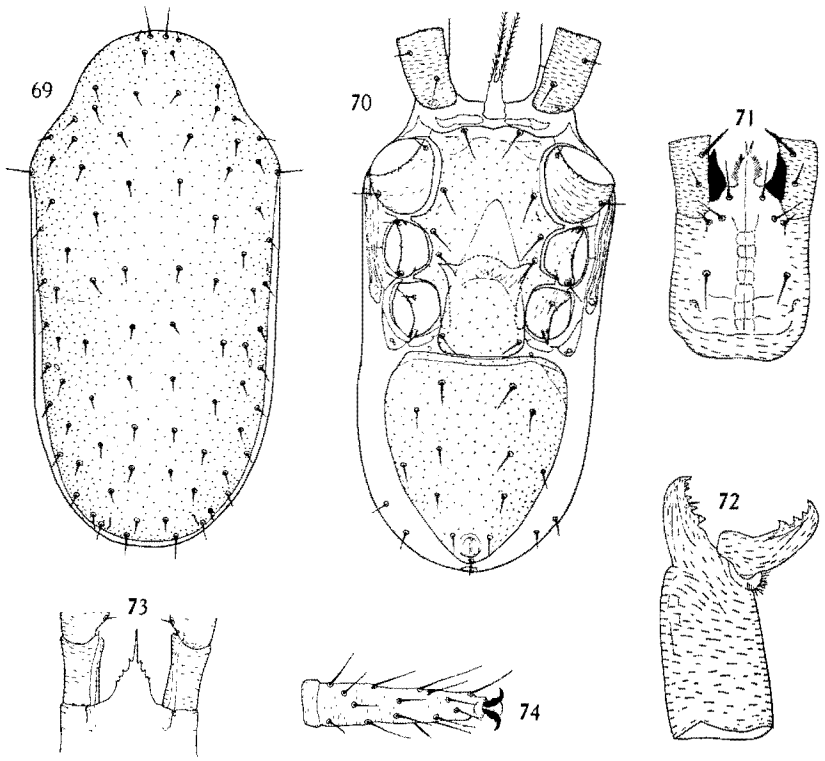
Gamasellevans magoebaensis spec. nov., figs. 69-79

FEMALE (figs. 69-74): Length 260-269 μ; breadth 125-139 μ; leg I 250-260 μ; leg IV 192-202 μ; length of ventri-anal shield 100-107 μ; breadth 91-103 μ; distance between posterior margins of sternal and genital shields 51-56 μ; breadth of genital shield 42-47 μ; length of sternal shield 65-68 μ; breadth 49-51 μ; length of podonotal region of dorsal shield 142 μ; breadth 125-139 μ; length of opisthonotal region 118-127 μ; postanal seta 9 μ; vertical setae 14-16 μ; scapular setae 16 μ; setae J5 14 μ.

This species is of approximately the same size as *G. epigynialis* but is it much more sclerotized.

Dorsum (fig. 69): With the exception of the verticals and scapulars the dorsal setae are short. The distribution of the 43 pairs of setae and two pairs of pores is shown in the figure. The dorsal shield is heavily punctated and the line of demarcation between the anterior and posterior parts is distinct.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).



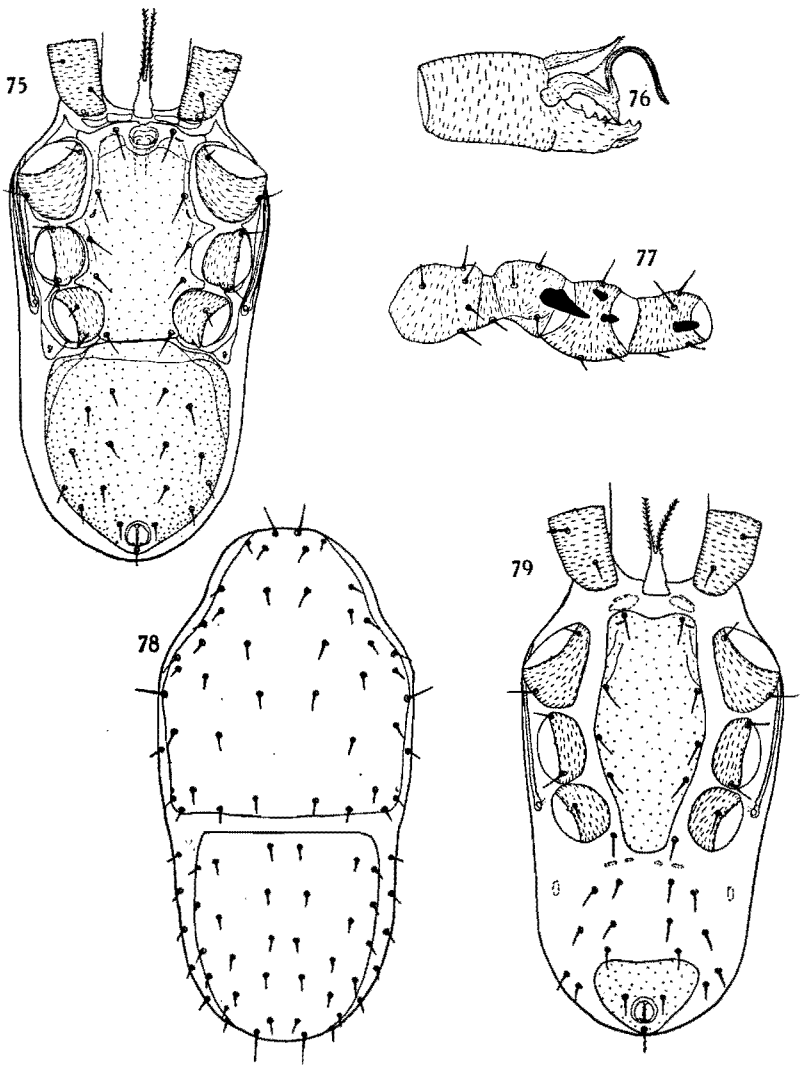
Figs. 69-74. *Gamasellevans nagoebaensis* spec. nov., female. 69. dorsum; 70. venter; 71. gnathosoma; 72. chelicera; 73. tectum; 74. tarsus I.

Venter (fig. 70): All the shields on the venter are punctated. The peritrematal shields are distinct. The metapodal shields are relatively small, each bearing two pore-like structures. The ventri-anal shield is provided with five pairs of setae in addition to the circumanals. The lateral interscutal membrane bears the usual two pairs of simple setae.

Gnathosoma (figs. 71-73): The palp trochanter bears of pair of serrate setae (fig. 71). The movable digit of the chelicera (fig. 72) is tridentate and the fixed digit has five teeth and a small pilus dentilis. The shape of the tectum is shown in fig. 73.

Legs: The claws on tarsus I (fig. 74) are prominent and placed on a very short pretarsus. Femur II bears an inconspicuous protuberance on its ventral aspect. The posterior margin of coxa IV has a spine-like projection. The chaetotactic patterns of the legs are normal.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).



Figs. 75-79. *Gamasellevans magoebaensis* spec. nov. 75. venter ♂; 76. chelicera ♂; 77. leg II ♂; 78. dorsum, deutonymph; 79. venter, deutonymph.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

MALE (figs. 75-77): Length 235-241 μ; breadth 116-123 μ; leg I 222-241 μ; leg IV 183-192 μ; length of ventri-anal shield 96-98 μ; breadth 84-88 μ; length of sternitigenital shield 102-104 μ; breadth 44-47 μ; length of podonotum 130 μ; breadth 116-123 μ; length of opisthonotum 105-111 μ; postanal seta 9 μ; vertical setae 12-14 μ; scapular setae 14 μ; setae J5 12 μ.

The male is slightly smaller than the female. The dorsum resembles that of the female. The punctated sternitigenital shield bears the usual five pairs of setae but the ventri-anal shield is provided with seven pairs in addition to the circumanals (fig. 75).

The gnathosoma closely resembles that of *G. reticulatus*. The movable digit of the chelicera (fig. 76) bears a minute tooth and a relatively short spermatophoral process. The fixed digit has four teeth as well as an anteriorly directed process. The spurs on leg II are depicted in fig. 77. In other respects the legs resemble those of the female.

DEUTONYMPH (figs. 78-79): Length 212 μ; breadth 102 μ; leg I 193μ; leg IV 154 μ; length of anal shield 28 μ; breadth 42 μ; length of sternal shield 105 μ; breadth 42 μ; length of anterior dorsal shield 121 μ; breadth 102 μ; length of posterior dorsal shield 86 μ; breadth 75 μ; postanal seta 9 μ; vertical setae 12 μ; scapular setae 14 μ; setae J5 12 μ.

The podonotum bears 22 pairs of setae, 21 pairs of which are situated on the anterior dorsal shield and one pair (r4) on the lateral membrane (fig. 78). The posterior dorsal shield carries 15 pairs of setae, the six of the R series being placed on the membrane.

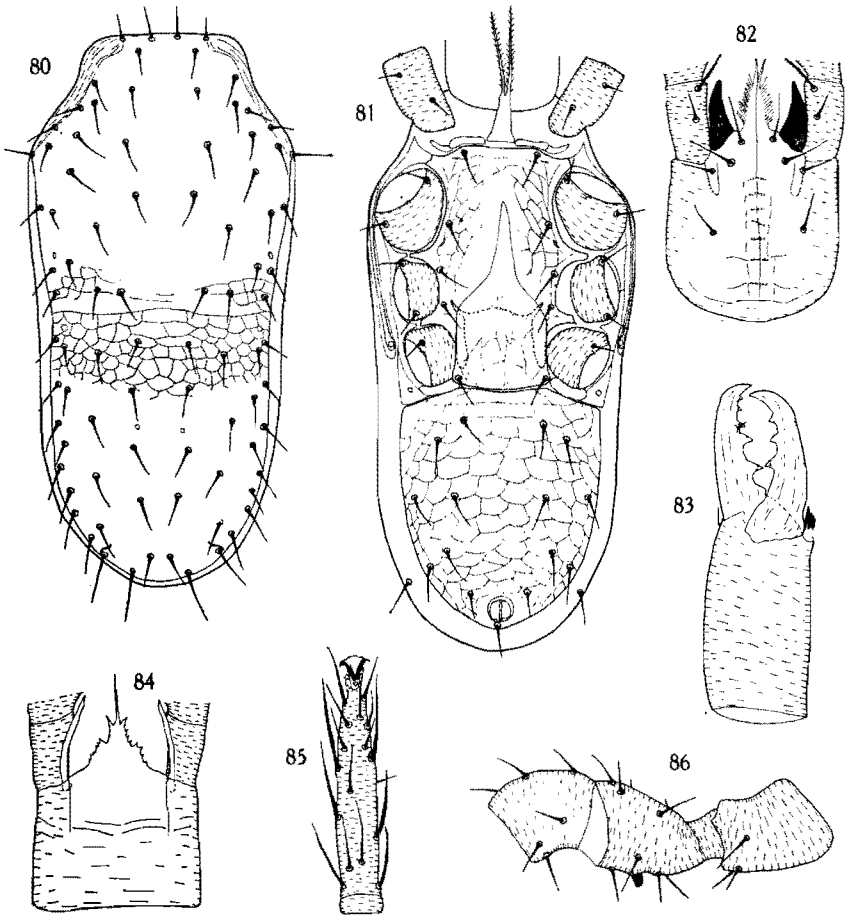
As in the adult the shields on the venter are punctated (fig. 79). The pre-endopodal and metapodal shields are present but indistinct. The opisthogastric cuticle bears seven pairs of setae. The postanal seta is relatively longer than in the adult.

MATERIAL STUDIED: ♀-Holotype, ♂-allotype, morphotype deutonymph, 3 ♀- and 2 ♂-paratypes from forest floor, Magoebaskloof, Transvaal; collected by R. A. van den Berg, 1963.

Gamasellevans reticulatus spec. nov., figs. 80-92

FEMALE (figs. 80-86): Length 308-327 μ; breadth 142-154 μ; leg I 299-318 μ; leg IV 241-250 μ; length of ventri-anal shield 128-135 μ; breadth 116-121 μ; distance between posterior margins of sternal and genital shields 44-47 μ; breadth of genital shield 54-58 μ; length of sternal shield 89-91 μ; breadth 58-63 μ; length of podonotal region of dorsal shield 154-158 μ; breadth 142-154 μ; length of opisthonotal region 140-154 μ; breadth 121-125 μ; postanal seta 21 μ; vertical setae 19 μ; scapular setae 23 μ; setae J5 21 μ; setae Z5 28-30 μ.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

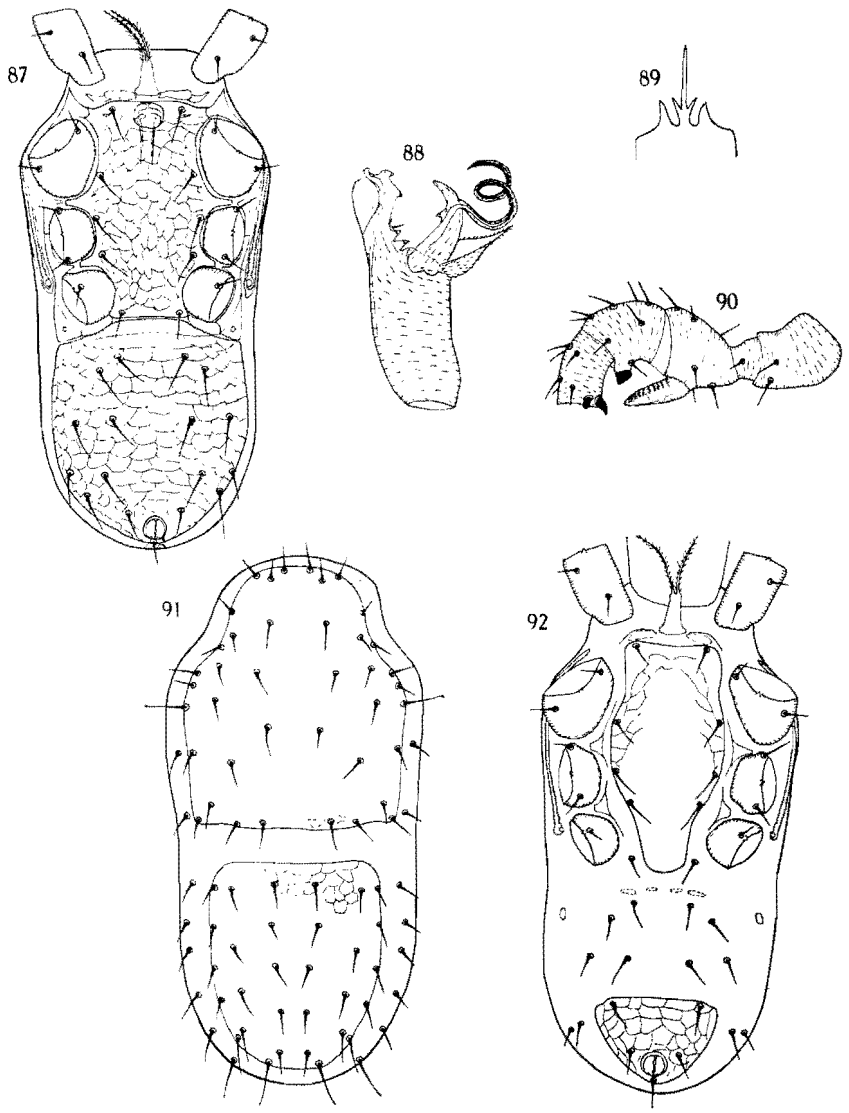


Figs. 80-86. *Gamasellevans reticulatus* spec. nov., female. 80. dorsum; 81. venter; 82. gnathosoma; 83. chelicera; 84. tectum; 85. tarsus I; 86. leg II.

Dorsum (fig. 80): The majority of the 43 pairs of relatively long dorsal setae are simple and their distribution resembles those of the other members of the genus. As in *G. evansi* the vertical setae have forked distal tips. Setae Z5 are slightly serrate distally. Both the podonotal and opisthonotal region of the dorsal shield are ornamented by means of interconnecting lines, those on the posterior shield being more conspicuous.

Venter (fig. 81): The sternal, genital and ventri-anal shields are ornamented by interconnecting lines, those on the latter shield forming a reticulate pattern. The metapodal-exopodal shield complex closely abuts the ventri-anal

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).



Figs. 87-92. *Gamasellevans reticulatus* spec. nov. 87. venter ♂; 88. chelicera ♂; 89. tectum ♂; 90. leg II ♂; 91. dorsum, deutonymph; 92. venter, deutonymph.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

shield which bears six pairs of setae in addition to the circumanals. The paraanal setae are placed on a line slightly anterior to the anus. The opisthogastric cuticle carries one pair of setae only.

Gnathosoma (figs. 82-84): The palp trochanter bears a pair of serrate setae (fig. 82). Gnathosomal setae gs2 are shorter than gs3. The chelicerae (fig. 83) resemble those of the other species of the genus. The shape of the tectum is shown in fig. 84.

Legs (figs. 85-86): All the legs are provided with pretarsi, claws and pulvilli; pretarsus I is reduced (fig. 85). Femur II bears a relatively prominent spur-like protuberance (fig. 86). The leg chaetotaxy is normal for the genus.

MALE (figs. 87-90): Length 260-279 μ; breadth 124-137 μ; leg I 260-279 μ; leg IV 202-212 μ; length of ventri-anal shield 105-119 μ; breadth 91-105μ; length of sternitigenital shield 112-117 μ; breadth 51-56 μ; length of podonotal region of dorsal shield 137-146 μ; breadth 124-137 μ; length of opisthonotal region 115-128 μ; breadth 105-112 μ; postanal seta 16-19 μ; vertical setae 12-14 μ; scapular setae 19-21 μ; setae J5 16-19 μ; setae Z5 26 μ.

The dorsum resembles that of the female. The sternitigenital and ventri-anal shields are conspicuously ornamented by a reticulate pattern (fig. 87). The latter shield bears 17 setae. In other respects the venter of the male is similar to that of the female. The chelicerae (fig. 88) are typical of the genus. The fixed digit has five teeth, one of which is minute; it also has a tube-like structure terminating in a small horn-like curved process. The movable digit has one tooth and bears the usual spermatophoral process distally and the sheath-like synarthrodial membrane at its base. The tectum (fig. 89) differs from that of the female in that it has no small denticles on its anterolateral margins. The spurs on leg II are shown in fig. 90.

DEUTONYMPH (figs. 91-92): Length 279 μ; breadth 138 μ; leg I 270 μ; leg IV 222 μ; length of ventri-anal shield 47 μ; breadth 68 μ; length of sternal shield 128 μ; breadth 58 μ; length of anterior dorsal shield 144 μ; breadth 121 μ; length of posterior dorsal shield 112 μ; breadth 96 μ; postanal seta 19 μ; vertical setae 16 μ; scapular setae 21 μ; setae J5 14 μ; setae Z5 26 μ.

The podonotum bears 22 pairs of setae, 20 pairs of which are placed on the anterior dorsal shield (fig. 91). The opisthonotum carries 21 pairs, the R series being situated on the lateral membrane. The posterior dorsal shield is distinctly ornamented by a reticulate pattern, the anterior shield having only a few lines. The venter (fig. 92) resembles those of other deutonymphs of the genus except that the opisthogastric cuticle is provided with only six pairs of setae, the seventh pair being placed on a ventri-anal shield.

MATERIAL STUDIED: ♀-Holotype, ♂-allotype, morphotype deutonymph, 35 ♀- and 22 ♂-paratypes from forest floor, Magoebaskloof, Transvaal; collected by R. A. van den Berg, 1963.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

ACKNOWLEDGEMENTS

We are indebted to Dr R. A. van den Berg for collecting part of the material on which this paper is based and we wish to acknowledge the financial assistance given by the Department of Agricultural Technical Services.

REFERENCES

EVANS, G. O. 1963. Observations on the chaetotaxy of the legs in the free-living Gamasina (Acari: Mesostigmata). *Bull. Br. Mus.* (*Nat. Hist.*) **10** : 276-303.

HIRSCHMANN, W. 1962. Acarologie. Schriftenreihe für vergleichende Milbenkunde. In Gangsystematik der Parasitiformes **5** : 1-56.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).